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FIVE NEW NORTH AMERICAN ZONITIDS.

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In the course of work on the North American Zonitidae in the collections of the United States National Museum, the following new species were discovered:

Retinella (Glyphyalus) virginica, new species.

Plate IV, figs 14–16.

Shell markedly depressed, somewhat flattened above and below, umbilicate, vitreous, pinkish-horn colored. The radial grooves (major growth wrinkles) are rather closely, but irregularly spaced; minor growth wrinkles less prominent; with minute spiral striae above and below, less distinct than in *R. burringtoni*. The spire is lower than that of any of the related species, in some examples approaching a plane; whorls 5 to 6 in adult shells. The earlier whorls seen from above slowly increasing and closely wound; the last whorl not rapidly expanding as in *R. wheatleyi*. Umbilicus funicular, rapidly widened by the slight centrifugal growth of the body whorl, in immature shells contained about 5 times in the major diameter of the shell; in adult shells about 3¾ times in the major diameter of the shell. Aperture transverse, wider than high; upper end of peristome meeting the penultimate whorl horizontally well above its periphery.

The type (U. S. N. M. Cat. No. 421081) was collected on the west slope of the Blue Ridge, in Clarke Co., Virginia, some 3 miles west of Trapp, Loudoun Co., by Paul Bartsch and J. P. E. Morrison, and measures: Height 2.1 mm.; Maj. diam. 5.3 mm.; Min. diam. 4.6 mm.; Aperture height 1.7 mm.; Ap. diam. 2.1 mm.; Umb. diam. 1.4 mm.; Whorls, 5.2.

Four paratypes (U. S. N. M. Cat. No. 421082), from the same lot, measure:

Height	Maj. diam.	Min diam.	Ap. height.	Ap. diam.	Umb. diam.	Whorls
1.9 mm.	4.4 mm.	4.0 mm.	1.6 mm.	1.9 mm.	0.9 mm.	5.0
1.8	4.1	3.7	1.5	1.8	0.8	5.0
1.3	2.7	2.4	1.1	1.2	0.6	4.0
1.1	2.5	2.3	1.0	1.1	0.5	3.6

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This newly discovered form may be distinguished by its larger size; by the proportionately wider umbilicus of adults; by the greater number of more slowly increasing whorls, with a lower spire and proportionately smaller aperture.

Other colonies of this species have been found by the writer on the top of the Blue Ridge, 1 mile south of Snicker's Gap, Clarke Co., Va.; on the north end of Loudoun Heights, Loudoun Co., Va.; and on the west slope of this portion of the Blue Ridge, across the Shenandoah River from Harper's Ferry, in Jefferson Co., West Virginia. A single specimen from Lexington, Virginia, is also in the National Museum collections. Some individuals among those collected in a rock-slide on Loudoun Heights, Va., have hyaline shells, lacking the pinkish horn color; in other respects they are typical.

The radula is typical of the section *Glyphyalus*, s. s.; an immature specimen from the Loudoun Co., Va., colony having the formula: 17 to 19—3—1—3—17 to 19. The individual teeth are similar to H. B. Baker's figures of the radula of *R. burringtoni* Pilsbry.[2]

According to the sizes of live and dead shells collected in July, August, and October, this species is probably mature in the spring (with a one-year life history) as has been indicated by H. B. Baker for *R. burringtoni*, *R. cumberlandiana*, *R. roemeri*, and *R. cryptomphala*.[3]

Retinella (Glyphaloides ?) floridana, new species.

Plate IV, figs. 11–13.

Shell of five whorls, possessing the characteristic sculpture of the subgenus, with regularly and closely spaced major growth wrinkles, of about the size of *R. roemeri*, but with the base of the body whorl more deeply rounded near the umbilicus, which has consequently steeper walls. The spire is regularly depressed-conic, but constantly higher, as is the body whorl, than in the specimens of *roemeri* seen. The aperture is roundly lunate, widest below the middle; peristome more sharply rounded at the periphery and in the columellar region. Umbilicus deep, steep-walled; contained about four times in the major diameter of the shell.

The type (U. S. N. M. Cat. No. 421084) was collected by E. H. Sellards near Ocala, Marion Co., Florida, "from crevices and caverns in limestone. Pleistocene ?" (collector's No. 8074), and measures: Height 2.6 mm.; Maj. diam. 4.5 mm.; Min. diam. 4.0 mm.; Aperture height 1.7 mm.; Ap. diam. 1.8 mm.; Umb. diam. 1.1 mm.; Whorls 5.2.

Nine paratypes (U. S. N. M. Cat. No. 421085) measure as follows:

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[2]Proc. Acad. Nat. Sci. Phila. 80, pl. 4, fig. 3, 1928.

[3]Op. Cit., 82, pp. 200, 202, 205, 213, 1930.

Height.	Maj. diam.	Min. diam.	Ap. height.	Ap. diam.	Umb. diam.	Whorls.
2.4 mm.	4.5 mm.	3.9 mm.	1.7 mm.	1.8 mm.	1.2 mm.	5.0
2.4	4.1	3.7	1.6	1.6	1.1	5.2
2.4	4.1	3.6	1.7	1.6	1.1	5.2
2.4	4.1	3.7	1.6	1.7	0.9	5.0
2.4	4.3	3.8	1.6	1.8	1.0	5.0
2.3	3.8	3.6	1.5	1.4	1.0	5.0
2.3	4.0	3.6	1.5	1.7	0.9	4.9
2.1	3.9	3.5	1.5	1.7	0.9	4.7
2.4	3.8	3.5	1.6	1.5	0.9	5.0
Average of the ten measured types:						
2.37 mm.	4.11 mm.	3.69 mm.	1.6 mm.	1.66 mm.	1.01 mm.	5.02

The many specimens in the original lot (U. S. N. M. Cat. No. 219003) are all dead shells, weathered to a chalky appearance. It appears unlikely that this species is Pleistocene as doubtfully noted by the collector. It may, however, be extinct at the present time. It should be found in the Ocala (Eocene) limestone area, wherever surface soil conditions are (or were) favorable.

Retinella (Glyphyalinia ?) columna, new species.

Plate IV, figs. 8–10.

Shell small, depressed, polished, vitreous, with the imperforate base widely indented in the umbilical region. The whorls (4 in type) are closely wound, somewhat flattened above and below, the last expanding toward the aperture. Nuclear whorls 1.3, finely punctate. The shell is finely spirally striate, with the major and minor growth wrinkles equally indistinct above and below; there are perhaps ten widely spaced major growth wrinkles on the last whorl. Aperture transverse-lunate; peristome meeting the body whorl horizontally above, then slanting toward the regularly and evenly rounded periphery, and meeting the body whorl at a very acute angle below, almost parallel to the upper slope of the peristome. Base imperforate; umbilicus closed by a tongue-shaped callus as in *cryptomphala.* The columellar callus is relatively heavy, gradually thinned out basally, reaching almost to mid-basal point of peristome; centrally it is prominent, filling up the acute columellar angle of the aperture for a distance. This filling shows through the base of the shell as an area a little wider than the callus filling the umbilicus.

The type (U. S. N. M. Cat. No. 362009) was collected by C. E. Engberg, at Olga, Washington, and measures: Height 1.15 mm.; Major diameter 2.45 mm.; Minor diameter 2.15 mm.; Aperture height 0.9 mm.; Aperture diameter 1.1 mm.; Whorls 4.

This new form is so strikingly different, with its small size, glassy, almost smooth shell, and with the prominent columellar callus forming an internal pillar 0.4 mm. in diameter, that there is no hesitancy in describing it from the single specimen seen.

Paravitrea reesei, new species.

Plate IV, figs. 5–7.

Shell small, subdiscoidal, polished, the 5¾ whorls (of type) closely wound. Spire low, with shallow sutures. Periphery well rounded above and below, in an almost even curve from suture to umbilicus. Sculpture consisting of irregularly spaced growth wrinkles or radial grooves; spiral sculpture indistinct above and below. Umbilicus deep, well-like, exhibiting all the whorls to the apex, contained about 5 times in major diameter of the shell. Aperture transverse-lunate; lip thin, simple.

Internal armature consisting in the smallest shells seen (of 2 to 2½ whorls and 1.0 to 1.3 mm. major diameter) of two conical teeth in a radial row, dividing the periphery into three almost equal sectors. In a specimen of 3 whorls and 1.4 mm. major diameter, two other teeth appear, a third prominent conical tooth basal to the earlier pair, and a fourth which is an indistinct callus or tubercle just beneath the suture. All the teeth are retained in the largest (adult) specimens; the uppermost prominent tooth is at the periphery, the two others in each row are evenly spaced on the base of the whorl.

The type (U. S. N. M. Cat. No. 423599) was collected on Peters Mountain, Monroe Co., West Virginia, along State highway #3, about ¼ mile from the Virginia boundary, by G. R. Hunt. It measures: Height 1.6 mm.; Major diameter 3.1 mm.; Minor diameter 3.0 mm.; Aperture height 1.2 mm.; Aperture width 1.45 mm.; Umbilical diameter 0.6 mm.; Whorls 5.75.

This new form may be easily distinguished by its small size; three prominent teeth in a radial row retained in large shells; and by an umbilicus narrower than that of *pilsbryana* Clapp. It is named in honor of A. M. Reese, who has inspired much recent work in the systematic Zoology of West Virginia.

Gastrodonta (Clappiella) saludensis, new species.

Plate IV, figs. 1–4.

Shell small, greenish, discoidal, about twice as wide as high. Spire almost flat; whorls five, tightly wound, practically in one plane, slowly and regularly increasing, well rounded above and below but somewhat flattened peripherally and separated by deep sutures on the spire and in the umbilicus. The last whorl is deflected slightly. Umbilicus wide, shallow, exhibiting all the whorls to the apex. Sculpture remarkable, consisting of regular rows of oval beads, projecting outward from the surface of the whorl, with the longer dimension radial, the whole giving the appearance of the grains on an ear of corn. The rows of beads, about 25 in number, extend from suture to suture. Nuclear whorls with the beaded ribs narrower than the interstices, but the ribs are gradually transformed into prominent rows of beads on later whorls, with the interstices inconspicuous. Aperture subcrescentic, higher than wide; peristome nearly vertical, a little sinuous above. Lip thin, but showing the beads along its edge. Internal lamellae complex, consisting of 3 or 4 pair of lamellae in the last third of

the last whorl. The smaller basal lamella is high, triangular, with a sinuous radial base, the inner corner bent over toward the aperture, the peripheral end upright but strongly hooked toward the aperture. At a little greater distance within is the larger, chisel-like and somewhat double, peripheral lamella, which forms a transverse barrier, with the upper end strongly bent toward the aperture. Alternating at equal distances beyond are the remaining 4 to 6 lamellae seen. Apparently these lamellae are progressively resorbed as new ones are added with new shell growth.

The type (U. S. N. M. No. 423597) was collected by the writer on the south side of Walnut Mountain, on a slope along Fall Creek, a tributary of the Saluda River, in the Saluda Mountains, Greenville Co., South Carolina. This locality is about a mile south of the North-South Carolina boundary on U. S. route 25. The type measures: Height 1.5 mm.; Major diameter 3.5 mm.; Minor diameter 3.2 mm.; Aperture height 1.3 mm.; Aperture width 0.9 mm.; Whorls 5.0.

Eight paratypes (U. S. N. M. No. 423598) have the following measurements:

No. of whorls	Height in mm.	Maj. diam. in mm.	Min. diam. in mm.	Ap. height in mm.	Ap. width in mm.
5.4	1.6	3.5	3.3	1.2	0.9
5.0	1.5	3.2	3.0	1.2	0.9
5.0	1.5	3.2	3.0	1.2	0.9
4.8	1.5	3.1	2.9	1.2	0.9
4.4	1.3	2.9	2.8	1.1	0.8
4.3	1.3	2.7	2.5	1.2	0.8
4.1	1.3	2.7	2.5	1.1	0.8
4.0	1.2	2.4	2.2	1.0	0.7

This interesting little form was taken from the lower layers of leafmold on a steep slope in company with:

Polygyra albolabris (Say)
Polygyra wetherbyi (Bland)
Polygyra christyi (Bland)
Polygyra inflecta (Say)
Polygyra hirsuta (Say)
Mesomphix inornatus (Say)
Mesomphix perlaevis vulgatus H. B. B.
Retinella indentata paucilirata (Morelet)
Zonitoides elliotti (Redfield)
Zonitoides limatulus (Ward)
Gastrodonta interna (Say)
Helicodiscus parallelus (Say)

Although the anatomy of this new species has not been examined, the unique arrangement and shape of the apertural lamellae, which match those seen in the single (immature) specimen of *Gastrodonta* (*Clappiella*) *aldrichiana* Pils. in the National Museum collections, indicate its close relationship thereto. To the unaided eye, this form is almost if not identical with *Helicodiscus parallelus;* under magnification, the differences are at once apparent.

EXPLANATION OF FIGURES, PLATE IV.

Figs. 1–3. *Gastrodonta* (*Clappiella*) *saludensis*, n. sp. Holotype.
Fig. 4. *Gastrodonta* (*Clappiella*) *saludensis*, n. sp. Internal lamellae of a paratype.
Figs. 5–7. *Paravitrea reesei*, n. sp. Holotype.
Figs. 8–10. *Retinella* (*Glyphyalinia* ?) *columna*, n. sp. Holotype.
Figs. 11–13. *Retinella* (*Glyphyaloides*) *floridana*, n. sp. Holotype.
Figs. 14–16. *Retinella* (*Glyphyalus*) *virginica*, n. sp. Holotype.

All figures approximately 7½ times natural size.